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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TAYLOR, VICTOR J	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/647,483	BESPALOV ET AL.	
	Examiner	Art Unit	
	Victor J. Taylor	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☒ Claim(s) *4 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Office Action*.

DETAILED ACTION

Drawings

1. The formal drawings marked replacement sheets for pages 1 to 10 were received on 10 January 2005 in response to the office communication under 37 CFR 1.121 mailed on 15 December 2004. These drawings are approved.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A (1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper."

Various publications on technologies based on the transient field behavior for the transient electromagnetic field methods with examples cited by Kauffman et al., and Sidorov et al., with publications by Saratov listed on page 3 and with the disclosure of DSR by Stolar Horizon Inc., are cited in the specification and in the description of the related art on page 3. The examiner request copies of this prior-art for the record.

In addition figure 1 of the drawings is prior art and no reference was made to this prior art drawing or to which publication or date of publication from which it originated in the IDS or in the specification. A search of the prior art finds US 6,727,696 and US 6,233,524 and US 6,206,108 and US 5,842,149 all with the common figure 1 drawing that is identical to figure 1 in the instant application. The specification in addition

incorporates the essential parts of this prior art drawing in the description of the preferred embodiments on pages 7-9. Therefore, unless the examiner on form PTO-892 has cited the references, they have not been considered.

Specification

3. The disclosure is objected to because of the following informalities:

The applicant claims a method for, "obtaining a parameter of interest of an earth formation" and details the support in the specification for "the finite conductivity" in the pipe if the shape of the applied current is assumed to be the Dirac function on page 16.

The claims recite a specific "finite non-zero conductivity". This term could include any conductivity range of the metallic drill tubing from absolute zero to near infinity. This conductivity of the drill string is determined by the specific characteristics of the specific material or steel alloy used and is determined by measurement or using the metallic conductivity table as found in the CCR Manuel for Chemical and Physical Properties to determine the conductivity of the specific alloy used and is a variable based on the electrical characteristic on the material used to construct the drill string.

Therefore the examiner objects to this term and could interpret this "finite non-zero conductivity" to include any conductivity found in the materials characteristics from super-conducting wire with extreme low resistance and high conductivity to the extreme of high resistance and low conductivity or anywhere in between these values.

The term as found in the claims for, "obtaining a parameter of interest of an earth formation" could include any parameter in the earth's formation including the resistivity and the conductivity as well as the bed boundaries

Therefore, the examiner objects to these terms and could interpret this parameter of interest term to include any parameter found in the earth formation as claimed and to further include the resistivity of the geological formation and the bed boundaries as well any other terms for the parameters of the earths formation. Appropriate correction is required.

Claim Objections

4. Claims 4 and 18 are objected to because of the following informalities: The limitations recite wording for the "substantially independent" spacing and it is not clear just what value or degree of "independent spacing" is required. It is not clear if the sensitivity of the receivers is independent of the spacing to the transmitter or the spacing between the transmitter and the receiver is dependent on the positioning. Appropriate correction is required.

Prior Art

5. The prior art of record and not relied upon is considered pertinent to the applicant;

I. Kriegshauser et al., US 6,553,314 in class 702/007 is cited for the conductivity measurements and skin effect correction with multi-frequency well logging instruments with anisotropic logging in figure 1 in combination with the entire patent.

II. Kriegshauser et al., US 6,466,872 in class 702/007 is cited for the method for array induction logging tools and determining apparent resistivity of anisotropic reservoirs in figure 1 all elements in combination with the entire patent.

III. Beard et al., US 5,666,057 in class 324/339 is cited for the conductivity measurements and skin effect correction with multi-frequency well logging instruments.

IV. Xiano et al., US 6,219,619 in class 702/007 is cited for the software focusing method for array induction logging tools.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabarovsky et al., in U. S. Patent 5,703,773.

With regard to claim 1, Tabarovsky et al., discloses all the limitations for claim 1 in figure 1 and further teaches, "obtaining a parameter of interest" as the measurement of parameter of resistivity R-8 in lines 20-25 of column 8 based on the model minimized and the optimization 104 in figure 9 using the wire line borehole tool 10 in figure 1 and in lines 10-24 of column 4.

He discloses the limitation of using a transmitter on the BHA tool for producing a first electromagnetic signal in the earth formation in figure 1 and in lines 10-25 of column 4.

He further discloses the limitation of using a plurality of receivers axially placed and separated along the tool BHA 10 for receiving the plurality of temporal signals that include the first signal and the second signal that depend upon the conductivity along the borehole face wall to detect the plurality of resistivity parameters of interest in figure 1 and discloses the tool 10- in lines 25-45 of column 4. He further teaches the limitations of using the receivers and the transmitters in the borehole for collecting data from the electrical conductivity and computer processes this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7 with the inversion modeling as found in lines 10-55 in column 9.

He further discloses the limitation of using a processor in the computer model 126 of figure 9 and further teaches the limitations of the receivers and transmitters in the borehole for collecting data from the electrical conductivity and computer processes this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7 with the inversion modeling as found in lines 10-55 in column 9. He further teaches the limitation of, "obtaining a parameter of interest" as the measurement of the parameter of the misfit between the skin effect of the corrected receiver responses and the simulated receiver responses based on the model minimized, see the abstract and the Model optimization 104 in figure 9. He further teaches another Parameter of interest as the near zone parameters of optimization 104 found in figure 9 and further teaches the various parameters of the earth formation using the earth formation conduction measurements as found surrounding the borehole instrument and processing the earth data parameter of interest in lines 15-40 column 3.

Tabarovsky et al., does not teach or discloses the exact wording for the term, "obtaining a parameter of interest of an earth formation", He teaches these parameters of interest of the near earth formation zone parameters 104 that comprise the "parameters of interest" that include the resistivity and earth zone parameters of interest of an earth formation in figure 9.

Therefore it would have been obvious to one skilled in the art at the time the invention was made to include the zone parameters of the first invention as the plurality of parameter of interest of the earth formation and process the zone parameters to produce a model based on the reduced skin effect between the receivers plurality of signals and reduce processing computer cost.

Re claim 2, Which stand rejected on the rejected base claim, the determining of the third parameter of interest is provided in the modeling computation processes of this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7 with the inversion modeling as found in lines 10-55 in column 9.

Re claim 3, Which stand rejected on the rejected base claim, the parameter of interest comprising a resistivity or a distance to bed boundary is provided in this data using the Taylor series in equation 9 found in lines 55-65 of column 7 by using the inversion modeling as found in lines 10-55 in column 9 to commutate resistivity from the conductivity measurement and compute the near earth formation zone parameters 104 that comprise the "parameters of interest" that include the resistivity and earth zone boundary parameters figure 9.

Re claim 4, Which stand rejected on the rejected base claim, the sensitivity of the third temporal signal is substantially independent of spacing between the receiver and transmitter is provided by the positioning of the receivers and transmitter in relation to the relative position for the particular earth formation in lines 50 column 4 and the modeling computation processes of this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7.

Re claim 5, Which stand rejected on the rejected base claim, the spacing of the receivers and transmitters are shown on the borehole tool and subject to engineering choice which depend on the frequencies chosen as depicted by those skilled in the art see lie 40 and lines 39-50 in column 5. For disclosures the receiver transmitter arrangement on the tool 10 in figure 1 appear approximately 2 meters spacing and are adjustable by choice of receivers or physical placement.

Re claim 6, which stands rejected on the rejected base claim, the limitation of the Taylor series expansion to the ½ in the equation 4 in line 1 of column 7.

Re claim 7, which stands rejected on the rejected base claim, the limitation of the Taylor series expansion to the ½ in the equation 4 in line 1 of column 7

Re claim 8, which stand rejected on the rejected base claim, the limitation of W3/2 coefficients with the Taylor equation in lines 1-65 of column 7.

Re claim 9, which stand rejected on the rejected base claim, the limitation of the filter is applied in the moving window 124 which selects parameters of optimization and applies filters in the modeling 126 in figure 9.

Re claim 10, which stand rejected on the rejected base claim, the limitation of the differential filtering is applied in the model filter 116 and applied in the moving window 124 which selects parameters of optimization and applies filters in the modeling 126 in figure 9.

Re claim 11, which stand rejected on the rejected base claim, the limitation of the partial derivate derived from the Taylor expansion in equation 1 in column 6 with the secant divertive for time derived from the inversion of the frequency term found in the omega w=2 phi f term 8 as found in the equations in lines 1-65 of column 7 and line 40.

Re claim 12, which stand rejected on the rejected base claim, the limitation of the integral filter in disclosure of the plurality of component frequencies selected from a Taylor series expansion for the conductivity interval in line 2 of column 8.

Re claim 13, which stands rejected on the rejected base claim, the limitation of a first and second time discloses in equation 10 matrixes in column 7.

Re claim 14, which stands rejected on the rejected base claim, the wire line tool 10 is discloses in figure 1 and discloses BHA and MWD and borehole tool and other means to deploy the measuring apparatus defined in the well know art for electrical logging of oil wells in lines 1-10 in column 1.

With regard to claim 15, the argument applied to claim 1 is applied to claim 15 for their common features. Tabarovsky et al., discloses all the limitations for claim 15 in figure 1 and further teaches, "determining a parameter of interest of an earth formation" as the measurement of the pluralities of parameters of resistivity R-8 in lines 20-25 of

column 8 based on the model minimized and the optimization 104 in figure 9 using the wire-line borehole tool 10 in the borehole in figure 1 and in lines 10-24 of column 4.

He discloses the limitation of the borehole tool 10 in figure 1 and in lines 10-25 of column 4. The tool is made of some metal having some conductivity determined by the selection of materials for a specific "finite non-zero conductivity". This term could include any conductivity range of the metallic drill tubing from absolute zero to near infinity. This conductivity of the drill string is determined by the specific characteristics of the specific material or steel alloy used and is determined by measurement or using the metallic conductivity table as found in the CCR Manuel for Chemical and Physical Properties to determine the conductivity of the specific alloy used and is a variable based on the electrical characteristic on the material used to construct the drill string. This tool 10 is disclosed in figure1 and in the tools for well logging devices found in lines 15 column 1.

He further discloses the transmitter on the borehole tool 10 in figure 1 and steps for a plurality of first electromagnetic signals.

He discloses a plurality of axially spaced receivers on the tool 10 in figure 1 and a plurality of receivers axially placed and separated along the tool BHA 10 for receiving the plurality of temporal transmitted signals that include the first signal and the second signal that depend upon the conductivity along the borehole face wall to detect the plurality of resistivity parameters of interest in figure 1 and discloses the tool 10- in lines 25-45 of column 4. He further teaches the limitations of using the receivers and the transmitters in the borehole for collecting data from the electrical conductivity and

computer processes this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7 with the inversion modeling as found in lines 10-55 in column 9.

He further discloses the limitation of using a processor in the computer model 126 of figure 9 and further teaches the limitations of the receivers and transmitters in the borehole for collecting data from the electrical conductivity and computer processes this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7 with the inversion modeling as found in lines 10-55 in column 9. Tabarovsky et al., further teaches the limitation of, "obtaining a parameter of interest" as the measurement of the parameter of the misfit between the skin effect of the corrected receiver responses and the simulated receiver responses based on the model minimized see the abstract and the optimization 104 in figure 9. He further teaches another Parameter of interest as the near zone parameters of optimization 104 found in figure 9 and further teaches the various parameters of the earth formation using the earth formation conduction measurements as found surrounding the borehole instrument and processing the earth data parameter of interest in lines 15-40 column 3.

Tabarovsky et al., does not teach or discloses the exact wording for the term, "obtaining a parameter of interest of an earth formation", He teaches these parameters of interest as the near earth formation zone parameters 104 that comprise the "parameters of interest" that include the resistivity and earth zone parameters figure 9.

Therefore it would have been obvious to one skilled in the art at the time the invention was made to include the zone parameters of the first invention as the plurality of parameter of interest of the earth formation and process the zone parameters to

produce a model based on the reduced skin effect between the receivers plurality of signals and reduce processing computer cost.

With regard to claim 9, Tabarovsky et al., discloses, "obtaining a parameter of interest" as the measurement of parameter of the misfit between the skin effect of the corrected receiver responses and the simulated receiver responses based on the model minimized see the abstract and the optimization 104 in figure 9.

Tabarovsky et al., further discloses the limitation of mandrel on the wire line in the borehole 2 with the receivers and multiple transmitters in figure 1.

Tabarovsky et al., further discloses the limitation of using a transmitter and at least one axially spaced receiver in lines 20-35 of column 3.

Tabarovsky et al., further discloses the limitation of using a processor in the computer model 126 of figure 9.

Tabarovsky et al., further discloses the limitation of determine resistivity from the data signals a near zone parameter 104 in figure 9 and computes the skin effect correction and apparent conductivity in figure 5.

Tabarovsky et al., further discloses the limitations of the receivers and transmitters in the borehole for collecting data from the electrical conductivity and computer processes this data using the Taylor series in equation 9 found in lines 55-65 of column 7 by using the inversion modeling as found in lines 10-55 in column 9. Tabarovsky et al., further teaches the limitation of, "obtaining a parameter of interest" as the measurement of the parameter of the misfit between the skin effect of the corrected receiver responses and the simulated receiver responses based on the model

minimized see the abstract and the optimization 104 in figure 9. He further teaches another Parameter of interest as the near zone parameters of optimization 104 found in figure 9. Tabarovsky et al., further teaches the various parameters of the earth formation using the earth formation conduction measurements as found surrounding the borehole instrument and processing earth data in lines 15-40 of column 3.

Tabarovsky et al., does not teach or discloses the exact wording for the term, "obtaining a parameter of interest of an earth formation", He teaches the parameter as near zone parameters 104 in figure 9.

Therefore it would have been obvious to one skilled in the art at the time the invention was made to include the zone parameters of the first invention as the parameter of interest of the earth formation and process the zone parameters to produce a model based on the reduced skin effect between the receivers and reduce processing computer cost.

Re claim 16, Which stand rejected on the rejected base claim, the determining of the third parameter of interest is provided in the modeling computation processes of this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7 with the inversion modeling as found in lines 10-55 in column 9

Re claim 17, Which stand rejected on the rejected base claim, the parameter of interest comprising a resistivity or a distance to bed boundary is provided in this data using the Taylor series in equation 9 found in lines 55-65 of column 7 by using the inversion modeling as found in lines 10-55 in column 9 to commutate resistivity from the conductivity measurement and compute the near earth formation zone parameters 104

that comprise the "parameters of interest" that include the resistivity and earth zone boundary parameters figure 9.

Re claim 18, Which stand rejected on the rejected base claim, the sensitivity of the third temporal signal is substantially independent of spacing between the receiver and transmitter is provided by the positioning of the receivers and transmitter in relation to the relative position for the particular earth formation in lines 50 column 4 and the modeling computation processes of this data by using the Taylor series in equation 9 and as found in lines 55-65 of column 7.

Re claim 19, Which stand rejected on the rejected base claim, the spacing of the receivers and transmitters are shown on the borehole tool and subject to engineering choice which depend on the frequencies chosen as depicted by those skilled in the art see lie 40 and lines 39-50 in column 5. For disclosures the receiver transmitter arrangement on the tool 10 in figure 1 appear approximately 2 meters spacing and are adjustable by choice of receivers or physical placement.

Re claim 20, which stands rejected on the rejected base claim, the Tabarovsky et al., teaches the limitation of the Taylor series expansion to the ½ in the equation 4 in line 1 of column 7

Re claim 21, which stands rejected on the rejected base claim, the Tabarovsky et al., teaches the limitation of the Taylor series expansion to the ½ in the equation 4 in line 1 of column 7

Re claim 22, which stand rejected on the rejected base claim, the limitation of W3/2 coefficients with the Taylor equation in lines 1-65 of column 7.

Re claim 23, which stand rejected on the rejected base claim, the limitation of the filter is applied in the moving window 124 which selects parameters of optimization and applies filters in the modeling 126 in figure 9.

Re claim 24, which stand rejected on the rejected base claim, the limitation of the differential filtering is applied in the model filter 116 and applied in the moving window 124 which selects parameters of optimization and applies filters in the modeling 126 in figure 9.

Re claim 25, which stand rejected on the rejected base claim, the limitation of the partial derivate derived from the Taylor expansion in equation 1 in column 6 with the secant divertive for time derived from the inversion of the frequency term found in the omega w=2 phi f term 8 as found in the equations in lines 1-65 of column 7 and line 40.

Re claim 26, which stand rejected on the rejected base claim, the limitation of the integral filter in disclosure of the plurality of component frequencies selected from a Taylor series expansion for the conductivity interval in line 2 of column 8

Re claim 27, which stands rejected on the rejected base claim, the limitation of a first and second time discloses in equation 10 matrixes in column 7.

Re claim 28 and 29, which stand rejected on the rejected base claim, the wire line tool 10 is discloses in figure 1 and discloses BHA and MWD and borehole tool and other means to deploy the measuring apparatus defined in the well know art for electrical logging of oil wells in lines 1-10 in column 1.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor J. Taylor whose telephone number is 571-272-2281. The examiner can normally be reached on 8:00 to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571-272-2863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

V. J. Taylor
11 April 2005.

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